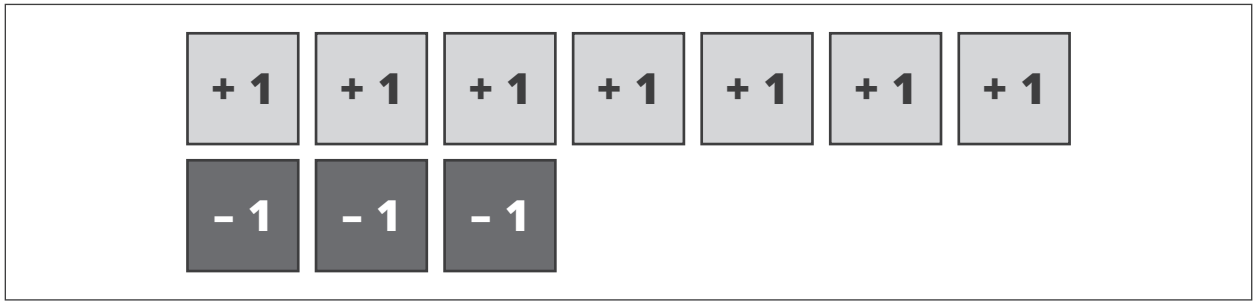
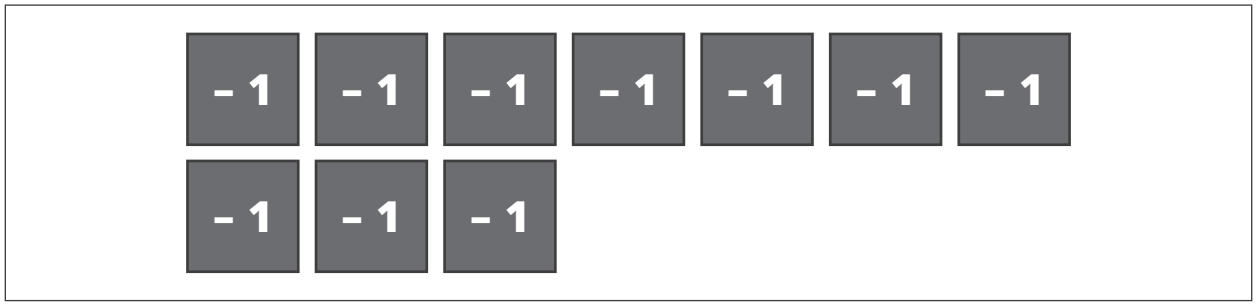
Adding and Subtracting Negative Numbers
Answers

Please note, the answers given are only possible solutions. There are other correct answers.

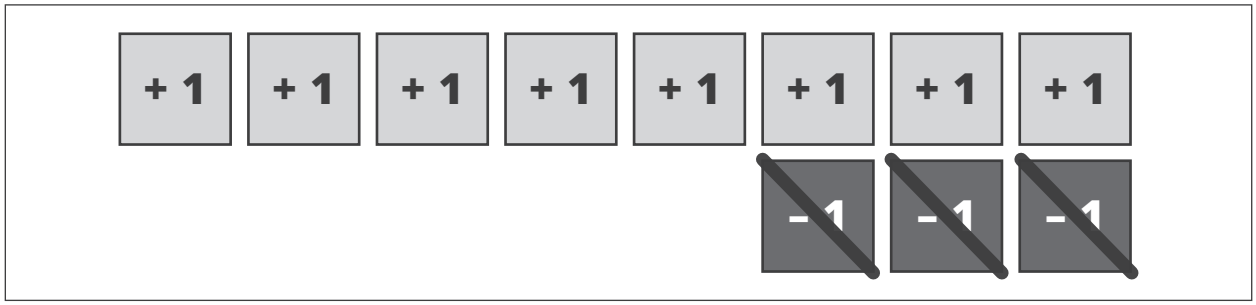
1. Use the box below to represent 7 + -3.



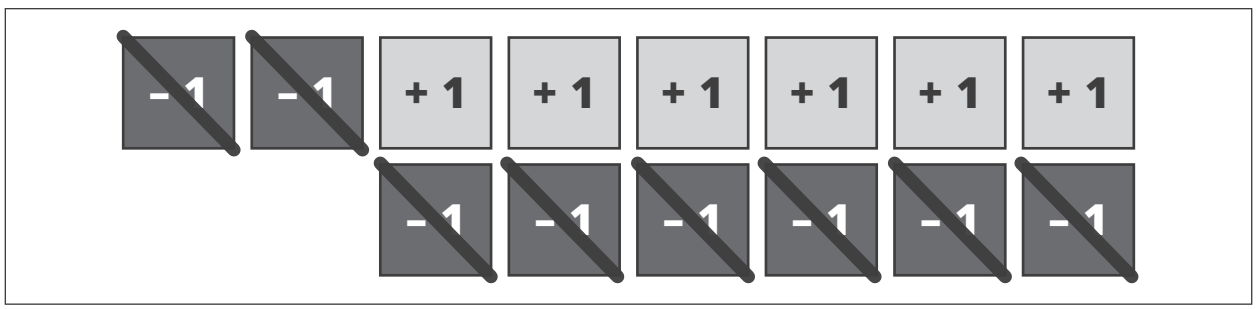
2. Use the box below to represent -7 + -3.



3. Use the box below to represent 5 – -3.



4. Use the box below to represent -2 – -8.



5. Use tiles to calculate each of these.

a. 4 + -3

1

b. 7 + -4

3

c. 8 + -5

3

d. 9 + -2

7

e. 7 – -3

10

f. 8 – -5

13

g. 12 – -2

14

h. -8 – -3

-5

i. -5 – -7

2

j. -6 – -2

-4

6. Use tiles to find 3 different calculations that all give an answer of -2.

Answers will vary.

7. Use tiles to work out these calculations.

a. 10 + -7 – -2

5

b. -7 + 10 – -3

6

c. -2 – -5 – -2

5

d. 9 – -3 + -12

0

8. In the squares below, each column and row add to the same number. Fill in the gaps.

a.

6	-2	-1
-4	6	**1**
1	-1	**3**

b.

4	2	-9
-1	**-8**	**6**
-6	**3**	0

c.

-8	8	6
5	0	**1**
9	-2	**-1**

Adding and Subtracting Negative Numbers

1. Use the box below to represent 7 + -3.

2. Use the box below to represent -7 + -3.

3. Use the box below to represent 5 – -3.

4. Use the box below to represent -2 – -8.

5. Use tiles to calculate each of these.

a. 4 + -3

b. 7 + -4

c. 8 + -5

d. 9 + -2

e. 7 – -3

f. 8 – -5

g. 12 – -2

h. -8 – -3

i. -5 – -7

j. -6 – -2

6. Use tiles to find 3 different calculations that all give an answer of -2.

7. Use tiles to work out these calculations.

a. 10 + -7 – -2

b. -7 + 10 – -3

c. -2 – -5 – -2

d. 9 – -3 + -12

8. In the squares below, each column and row add to the same number. Fill in the gaps.

a.

	-2	-1
-4	6	
	-1	

b.

4	2	-9
-1		
		0

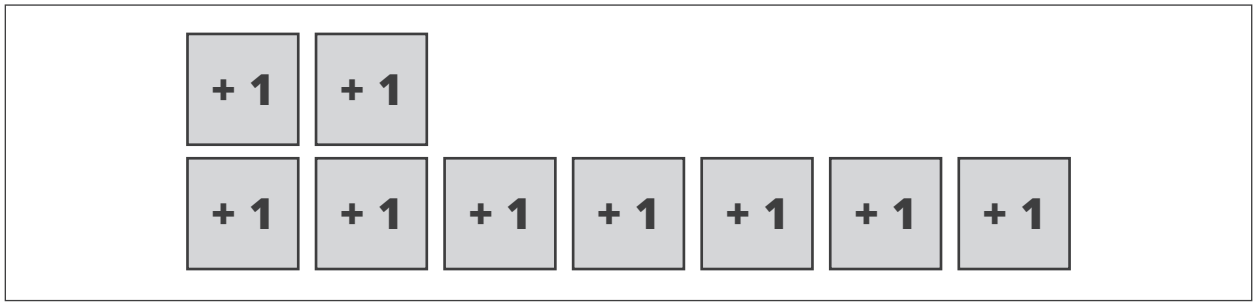
c.

-8	8	6
5	0	
	-2	

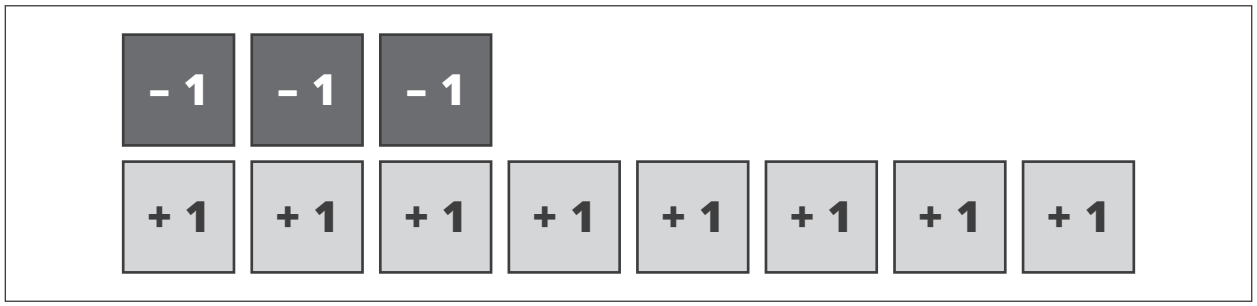
Adding and Subtracting Positive Numbers
Answers

Please note, the answers given are only possible solutions. There are other correct answers.

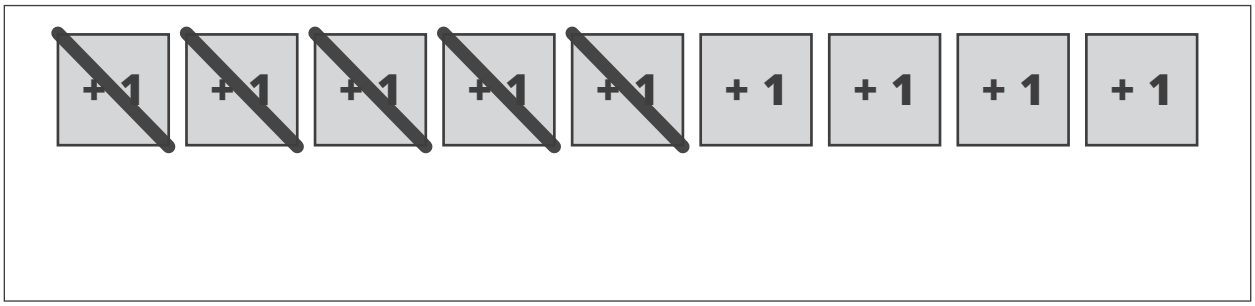
1. Use the box below to represent 2 + 7.



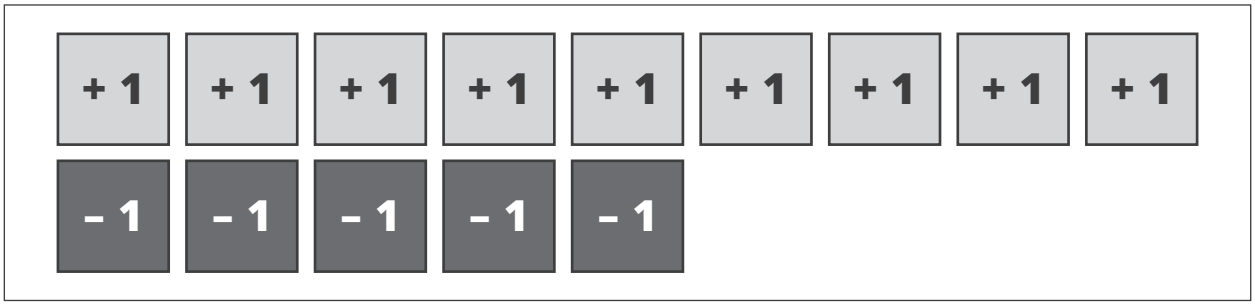
2. Use the box below to represent -3 + 8.



3. Use the box below to represent 9 – 5.



Or



4. Use tiles to calculate each of these.

a. 4 + 9
13

b. 2 + 7
9

c. 5 – 3
2

d. 8 – 3
5

e. -3 + 8
5

f. -8 + 3
-5

g. 8 – 7
1

h. -7 + 8
1

i. 10 – 3
7

j. -3 + 10
7

5. Use tiles to find 3 different calculations that give an answer of 3.

Answers will vary.

6. Use tiles to work out these calculations.

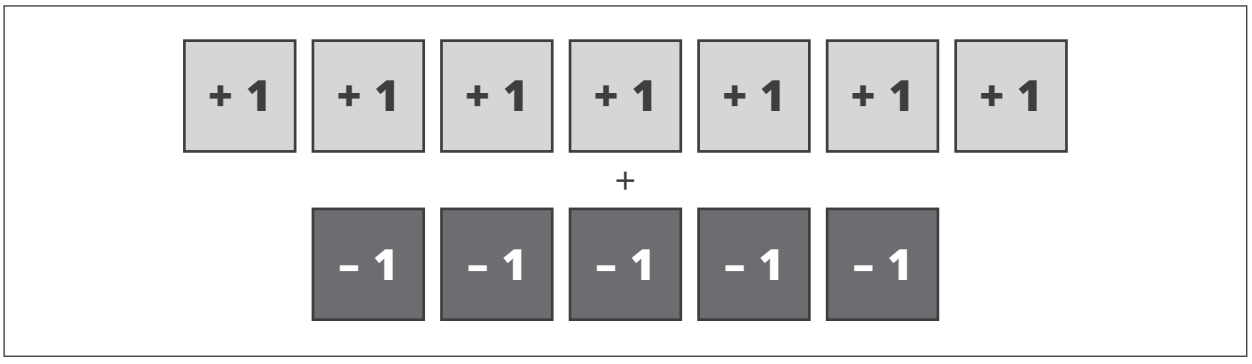
a. 5 – 2 + 7
10

b. 4 – 4 + 6
6

c. 6 + 3 – 2
7

d. 7 – 6 + 8
9

7. Eleanor uses the following tiles to calculate -5 + 7.



She says -5 + 7 = 12 because there are 12 tiles. Explain why Eleanor is wrong.

Eleanor has counted the tiles before cancelling the positive-negative pairs. If she does this, she will be left with two positive tiles, therefore -5 + 7 = 2.

Adding and Subtracting Positive Numbers

1. Use the box below to represent 2 + 7.

2. Use the box below to represent -3 + 8.

3. Use the box below to represent 9 – 5.

4. Use tiles to calculate each of these.

a. 4 + 9 _____

b. 2 + 7 _____

c. 5 – 3 _____

d. 8 – 3 _____

e. -3 + 8 _____

f. -8 + 3 _____

g. 8 – 7 _____

h. -7 + 8 _____

i. 10 – 3 _____

j. -3 + 10 _____

5. Use tiles to find 3 different calculations that give an answer of 3.

6. Use tiles to work out these calculations.

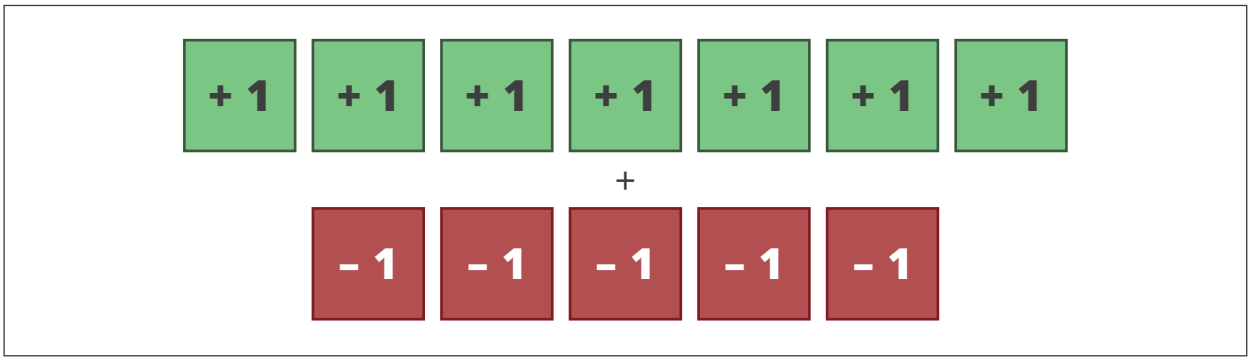
   a. 5 – 2 + 7

   b. 4 – 4 + 6

   c. 6 + 3 – 2

   d. 7 – 6 + 8

7. Eleanor uses the following tiles to calculate -5 + 7.



She says -5 + 7 = 12 because there are 12 tiles. Explain why Eleanor is wrong.

+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1	– 1

Representing Numbers using Tiles **Answers**

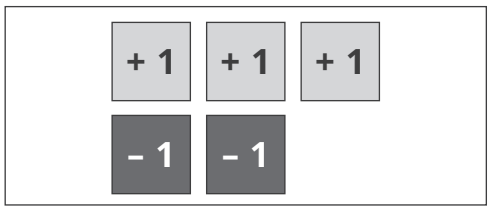
1. In the boxes below, write 3 different methods to represent each number.

   a. 5 b. -5 c. 7 d. 0 e. -2 f. 8

   Answers will very.

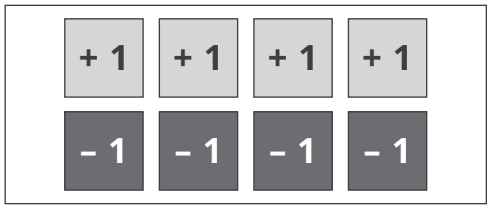
2. Which numbers are represented by the tiles below?

a.



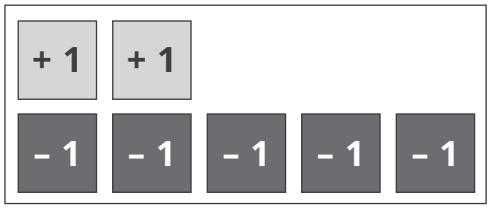
1

b.



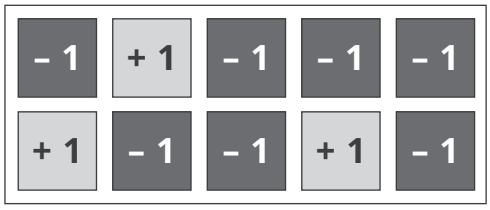
0

c.



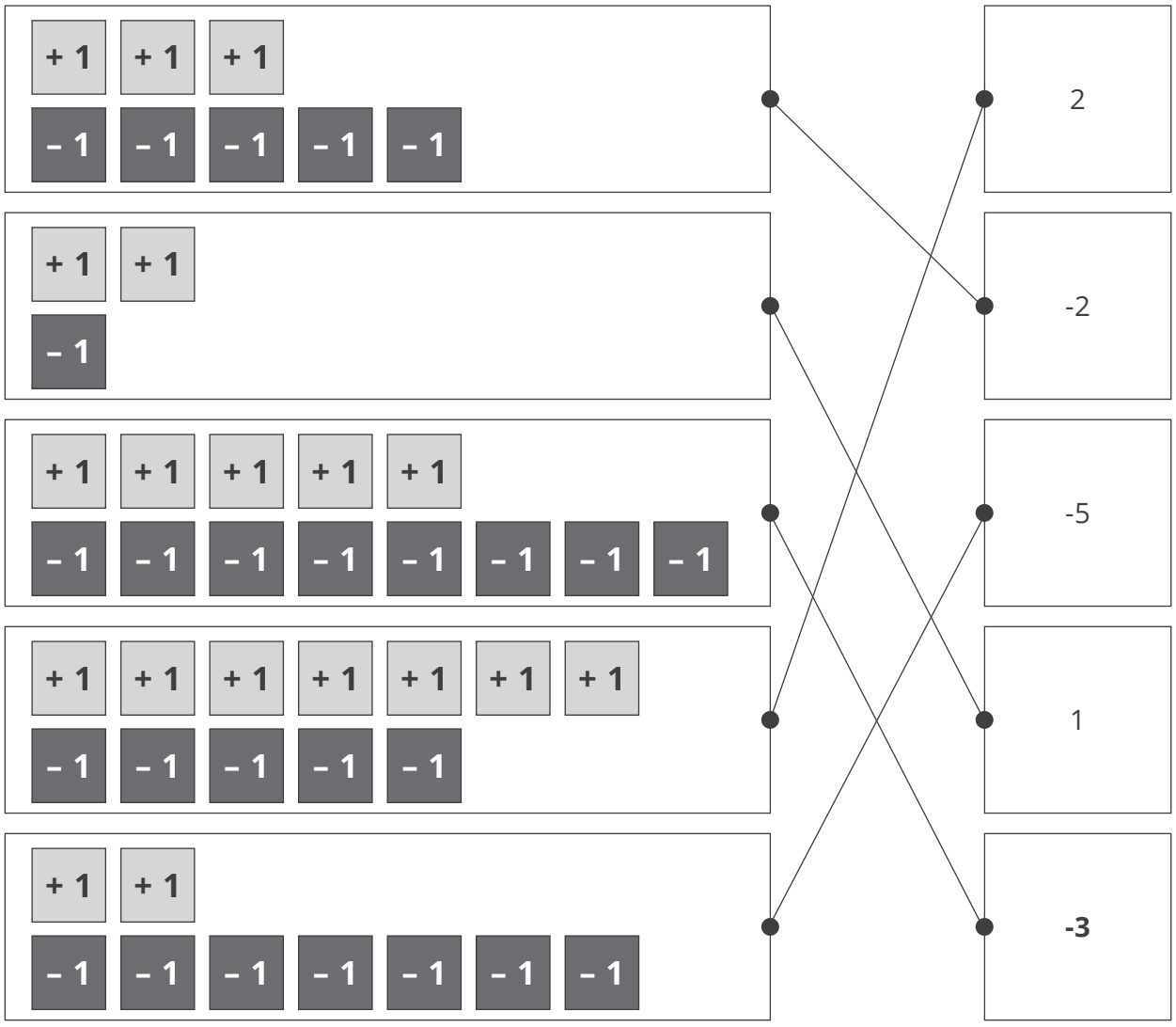
-3

d.



-4

3. Match the numbers with the representations. One number is missing – make sure you fill it in.



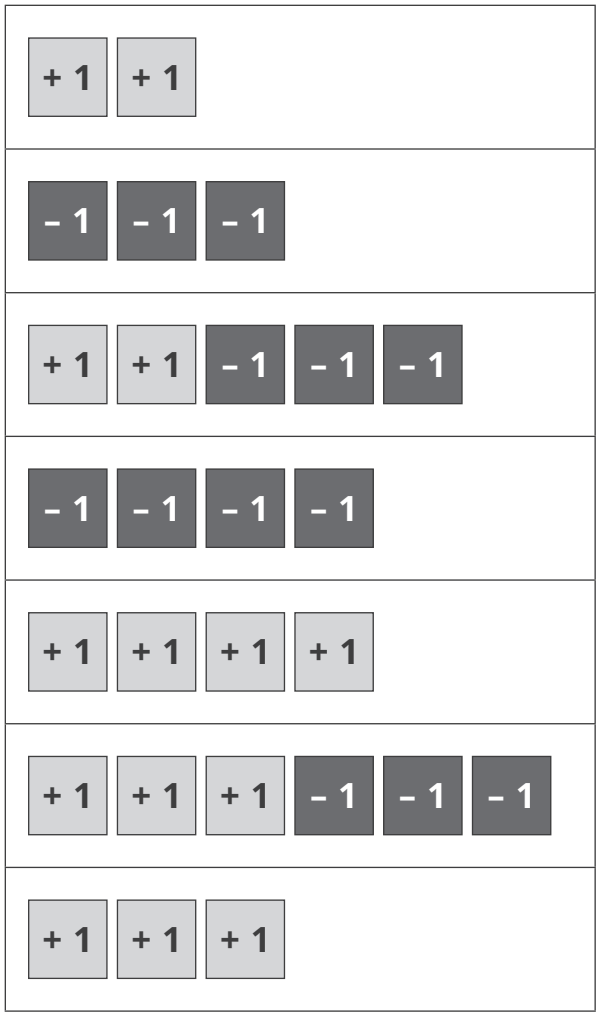
4. Is it possible to use 8 tiles to represent -5? Explain your answer.

   No, it takes 5 tiles to represent -5. Any extra tiles you add must be in pairs – one positive and one negative – so there will always be an odd number of tiles representing -5.

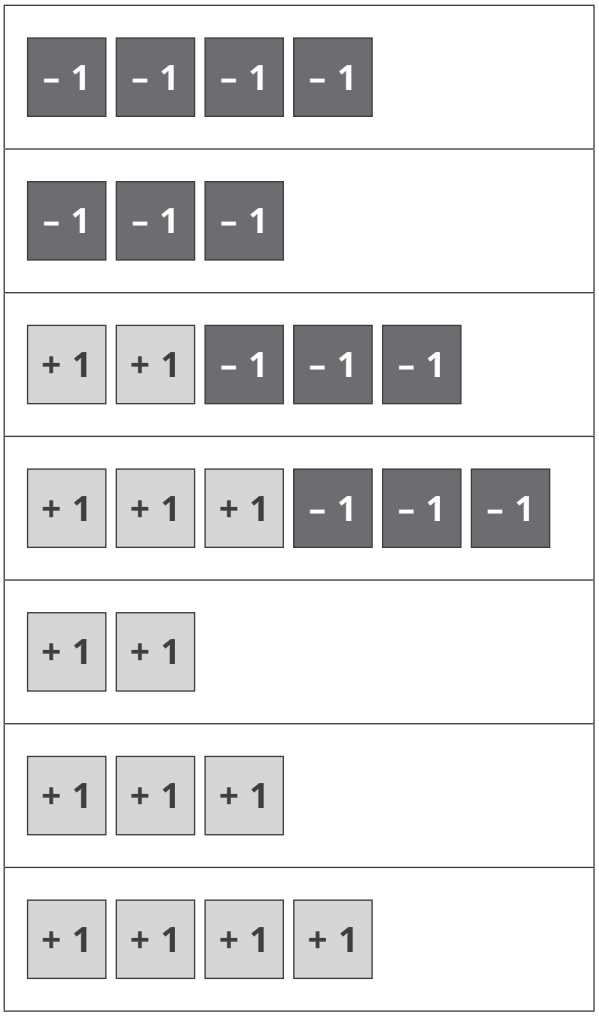
5. Euan says that -8 is higher than 4 because it takes more tiles to represent it. Explain why Euan is wrong.

   -8 is further away from zero than 4 but it isn't higher because -8 is negative and 4 is positive.

6. Arrange these representations in ascending order (from smallest to largest).



Answers:



Representing Numbers using Tiles

1. In the boxes below, write 3 different methods to represent each number.

a. 5

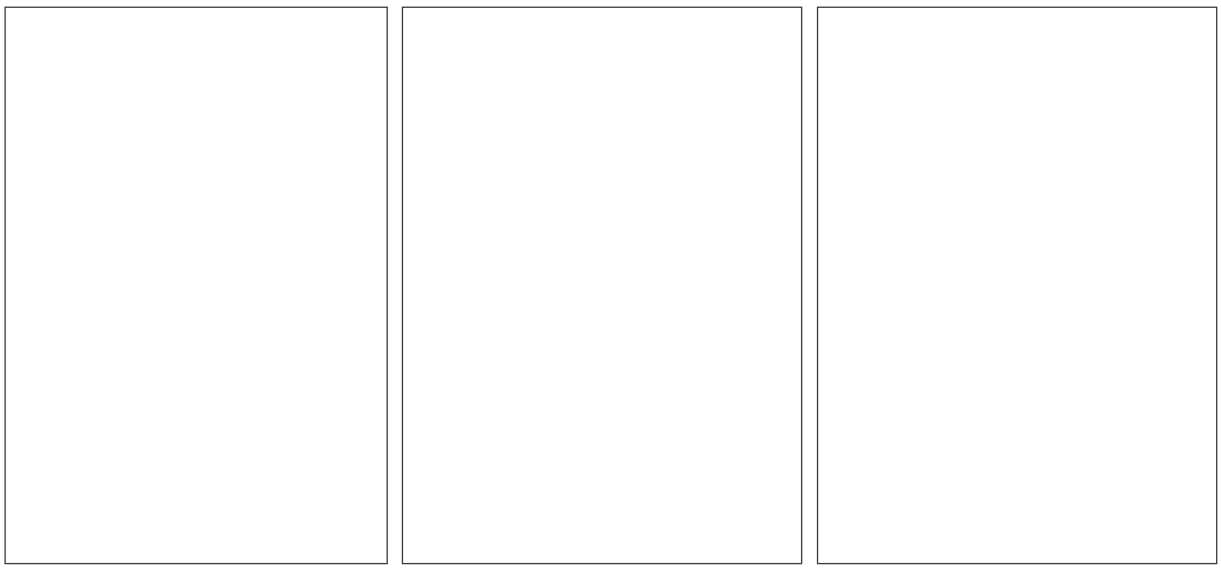
b. -5

c. 7

d. 0

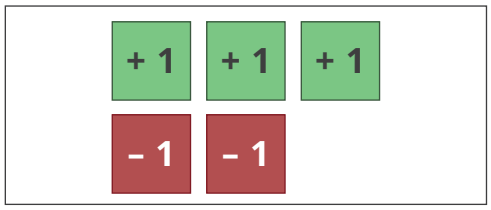
e. -2

f. 8



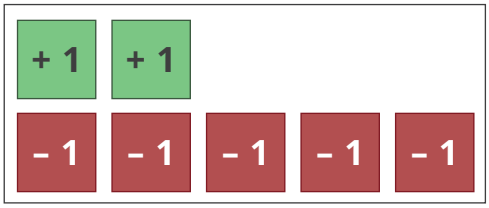
2. Which numbers are represented by the tiles below?

a.



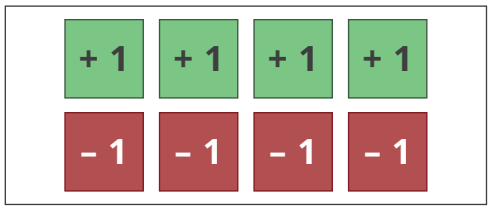
_____

c.



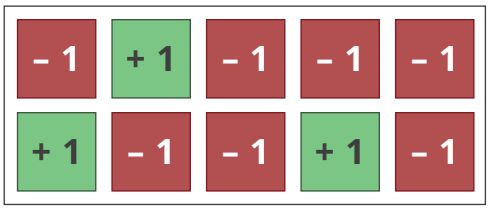
_____

b.



_____

d.



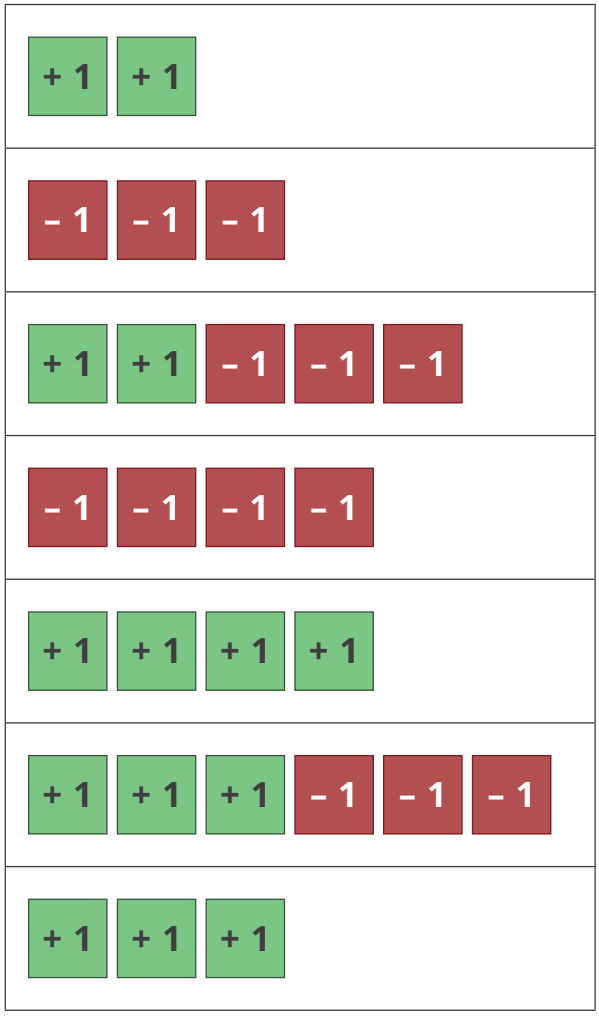
_____

3. Match the numbers with the representations. One number is missing – make sure you fill it in.

4. Is it possible to use 8 tiles to represent -5? Explain your answer.

5. Euan says that -8 is higher than 4 because it takes more tiles to represent it. Explain why Euan is wrong.

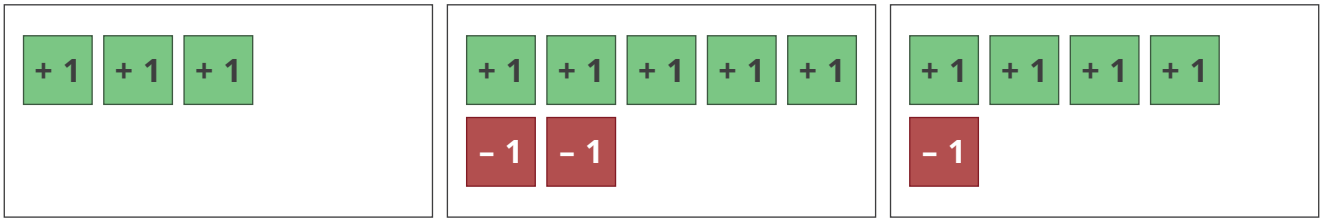
6. Arrange these representations in ascending order (from smallest to largest).



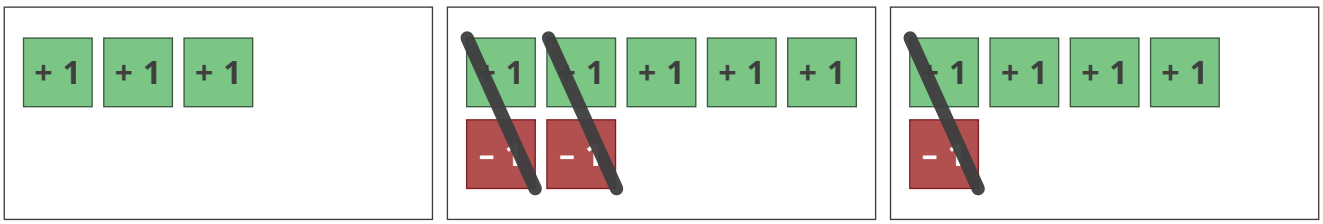
Teaching Directed Number Using Tiles

Representing Numbers Using Tiles

This method uses tiles to find different ways of representing numbers. An important point of understanding is that there is more than one way to represent a single number. For example, to represent the number 3, we could use any of the following sets of tiles:

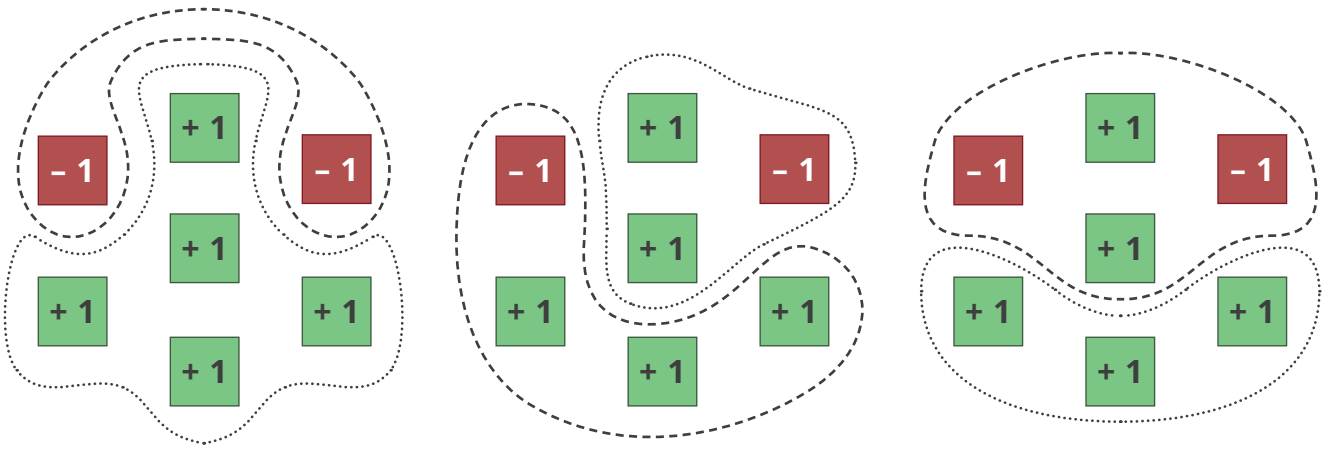


The most appropriate representation depends on the question you are answering. It can be useful to pair off the negative and positive tiles and make it clear to students that a negative and a positive tile together will cancel each other out. We will call this a positive-negative pair; it is sometimes called a zero pair.



Alternatively, you can give students a single set of tiles and ask them to divide them into different pairs of numbers. For example, the tiles below represent the number 3, but they can be divided up into:

5 and -2 (5 + -2 = 3); 1 and 2 (1 + 2 = 3); 3 and 0 (3 + 0 = 3); among other combinations.



5 and -2

5 + -2 = 3

1 and 2

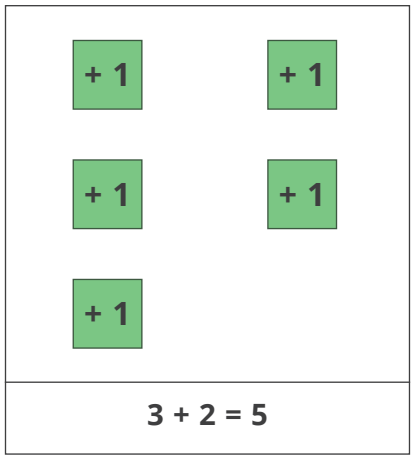
1 + 2 = 3

3 and 0

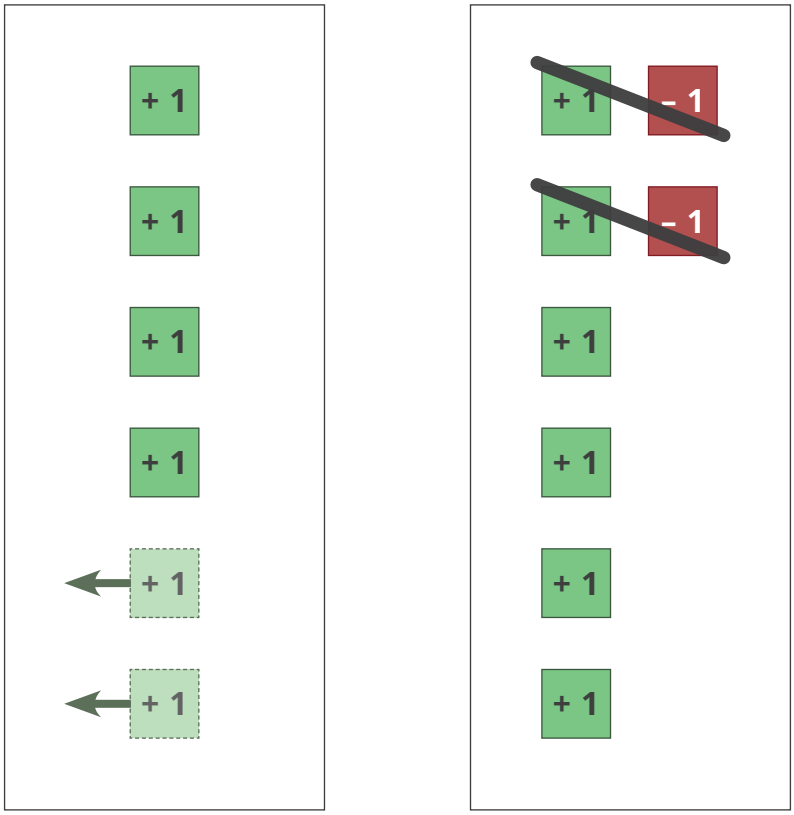
3 + 0 = 3

Basic Addition and Subtraction

Addition of positive numbers is simply a case of adding more tiles:



However, there is more than one way to visualise subtractions. Consider the sum 6 – 2:

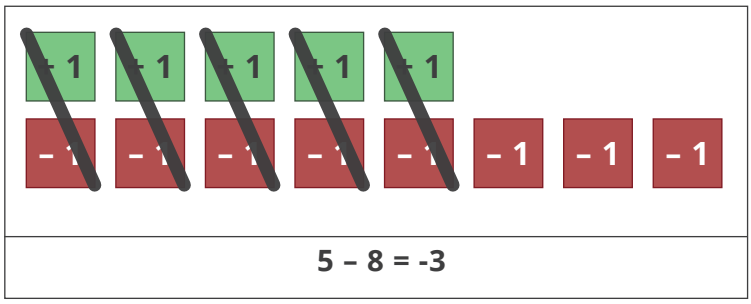


Both of these methods give the same answer to the same sum but they each look at the calculation in a different way. On the left, we are subtracting 2 by **removing 2** positive tiles. On the right, we are subtracting 2 by **adding 2** negative tiles then cancelling the positive-negative pairs. It is important that students see these as equivalent – each way of looking at the problem is useful in different contexts.

While questions of the form 5 + 3 or 10 – 5 are something students are expected to have covered prior to KS3, they can be useful as a way of practising using tiles.

Additions and Subtractions Crossing 0

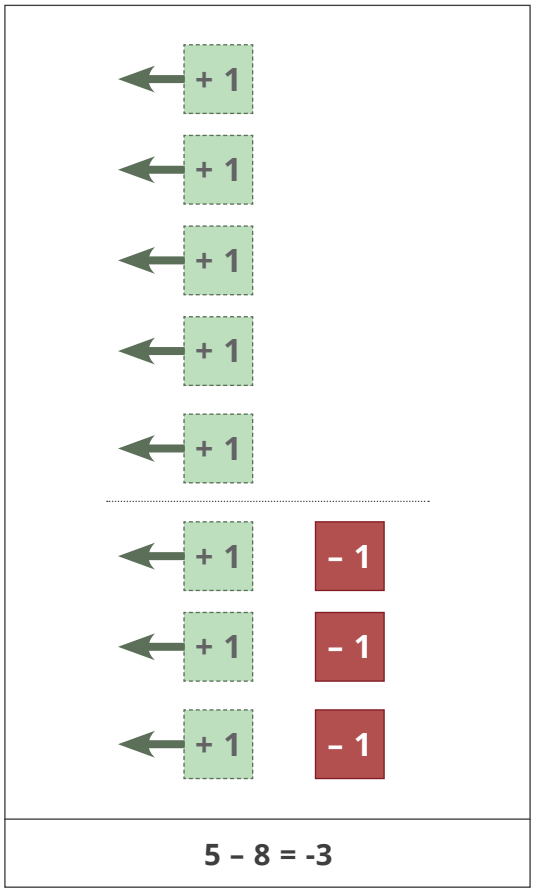
Consider a question such as 5 – 8. Here, we can't simply remove 8 positive tiles from 5; there aren't enough. This might suggest that the only way to answer this question using tiles is to add in the 8 negative tiles, then see what's left after we cancel the positive-negative pairs:



Once we've cancelled the positive-negative pairs, we are left with 3 negative tiles:

5 – 8 = -3

However, this is not the only way to represent this question. While we can't simply remove 8 positive tiles, there is more than one way to represent the number 5. If we use 5 positive tiles and 3 positive-negative pairs (each pair sums to 0 so this doesn't change our original value) then we now have enough positive tiles to remove the 8 required for our subtraction:

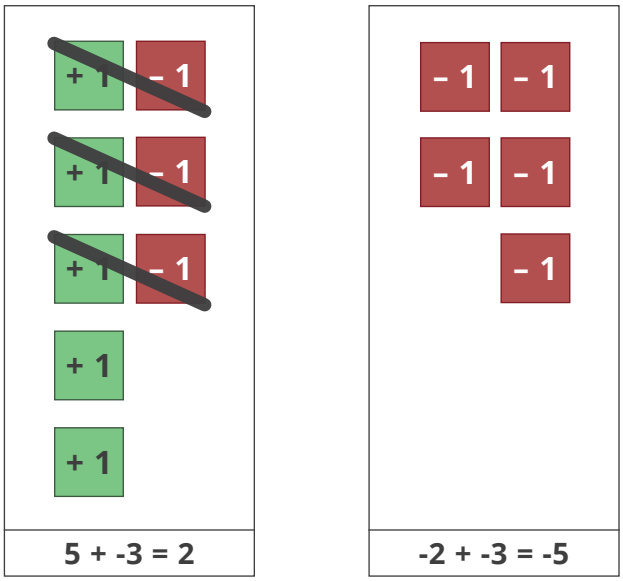


Once we have added the 3 positive-negative pairs, then removed the 8 positive tiles (to represent the subtraction), we are left with -3.

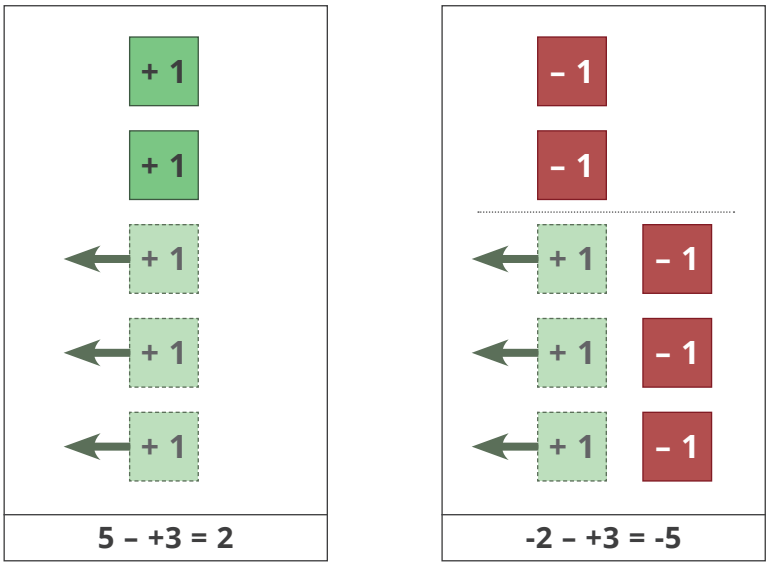
Adding and Subtracting Negative Numbers

We can extend these methods to answer the type of questions that students tend to find more difficult: those in the form 6 + -2, 8 – +3 or 9 – -2.

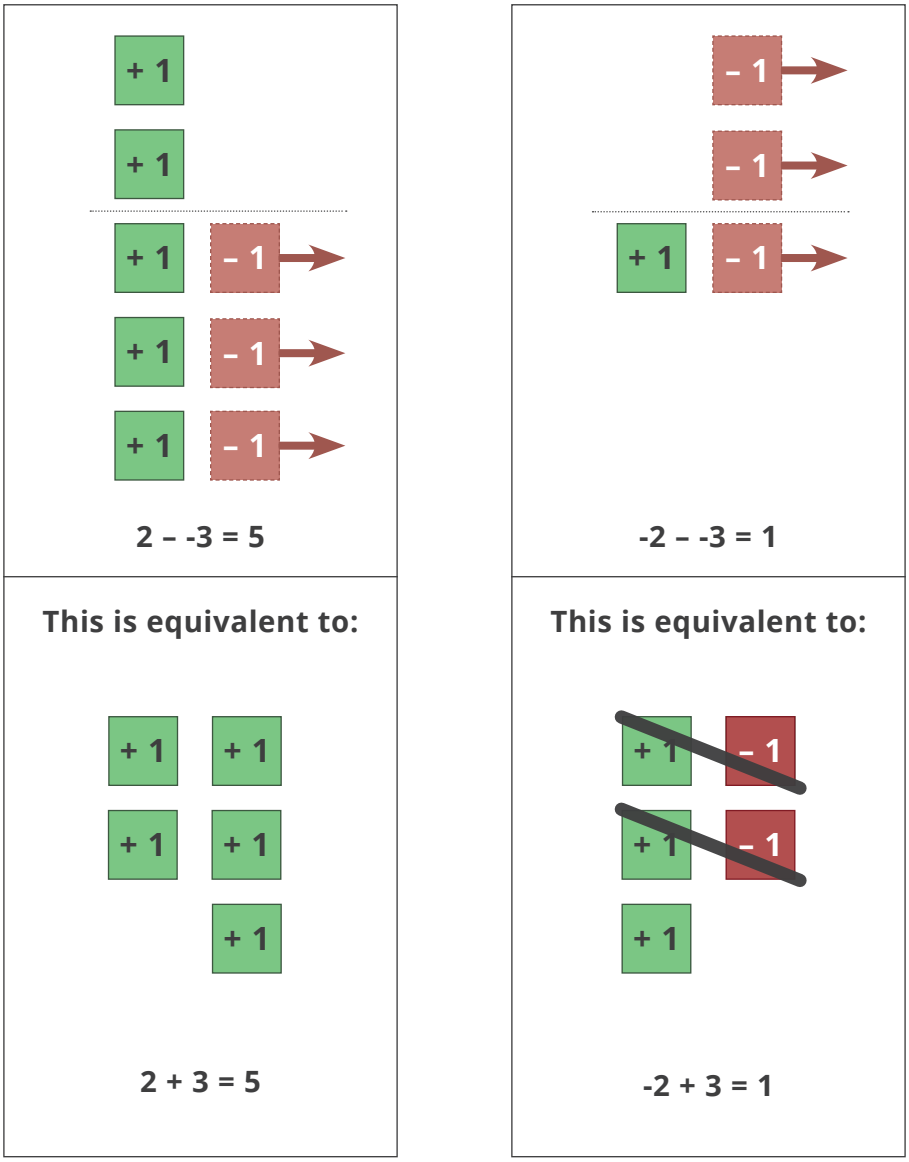
For calculations where you are adding a negative, the method is fairly simple – just use the given number of negative tiles and remove any positive-negative pairs:



When subtracting a positive, you can remove the required number of positive tiles. If there are insufficient positive tiles, use extra positive-negative pairs until you have enough. This may be a good time to demonstrate that you will always get the same result if you remove positive tiles or add negative tiles, and that adding a negative is therefore equivalent to subtracting a positive.



Similarly, when subtracting a negative, remove the given number of negative tiles, using extra positive-negative pairs where necessary to get the required number of negative tiles. This can be compared with adding positive tiles, to show that subtracting a negative is the same as adding a positive.



Arranging Tiles

Depending on whether you are using physical tiles, tiles drawn in books or tiles on an interactive whiteboard, you will have different options of how to present and remove tiles. No matter the method, it is best to encourage students to arrange tiles methodically and pair up any positive and negative tiles present.